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Yanagawa

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(54) **NON-TRANSITORY STORAGE MEDIUM STORING INSTRUCTIONS EXECUTABLE BY DEVICE CONTROL APPARATUS, DEVICE CONTROL METHOD, AND DEVICE CONTROL APPARATUS**

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G06F 3/12 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 3/1253*** (2013.01); ***G06F 3/1285*** (2013.01)

(58) **Field of Classification Search**
None
See application file for complete search history.

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(57) **ABSTRACT**

A non-transitory storage medium stores instructions executable by a device control apparatus including a storage for storing a setting value. The instructions cause the device control apparatus to: display a first setting screen for selection of the setting value for each of setting items; when a setting value for at least one of the setting items is changed from a particular setting value to a setting value, set the changed setting value as one of options regarding setting values for at least one changed setting item; display a second setting screen containing the set option being in a selected state, as the setting value for the at least one changed setting item; and for each of the at least one changed setting item, when the setting value determined by a selecting and determining operation differs from the particular setting value, store the determined setting value into the storage.

14 Claims, 9 Drawing Sheets

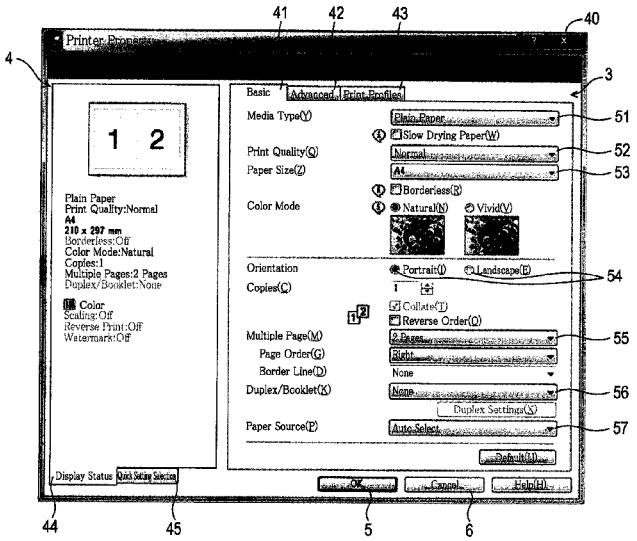


FIG.1

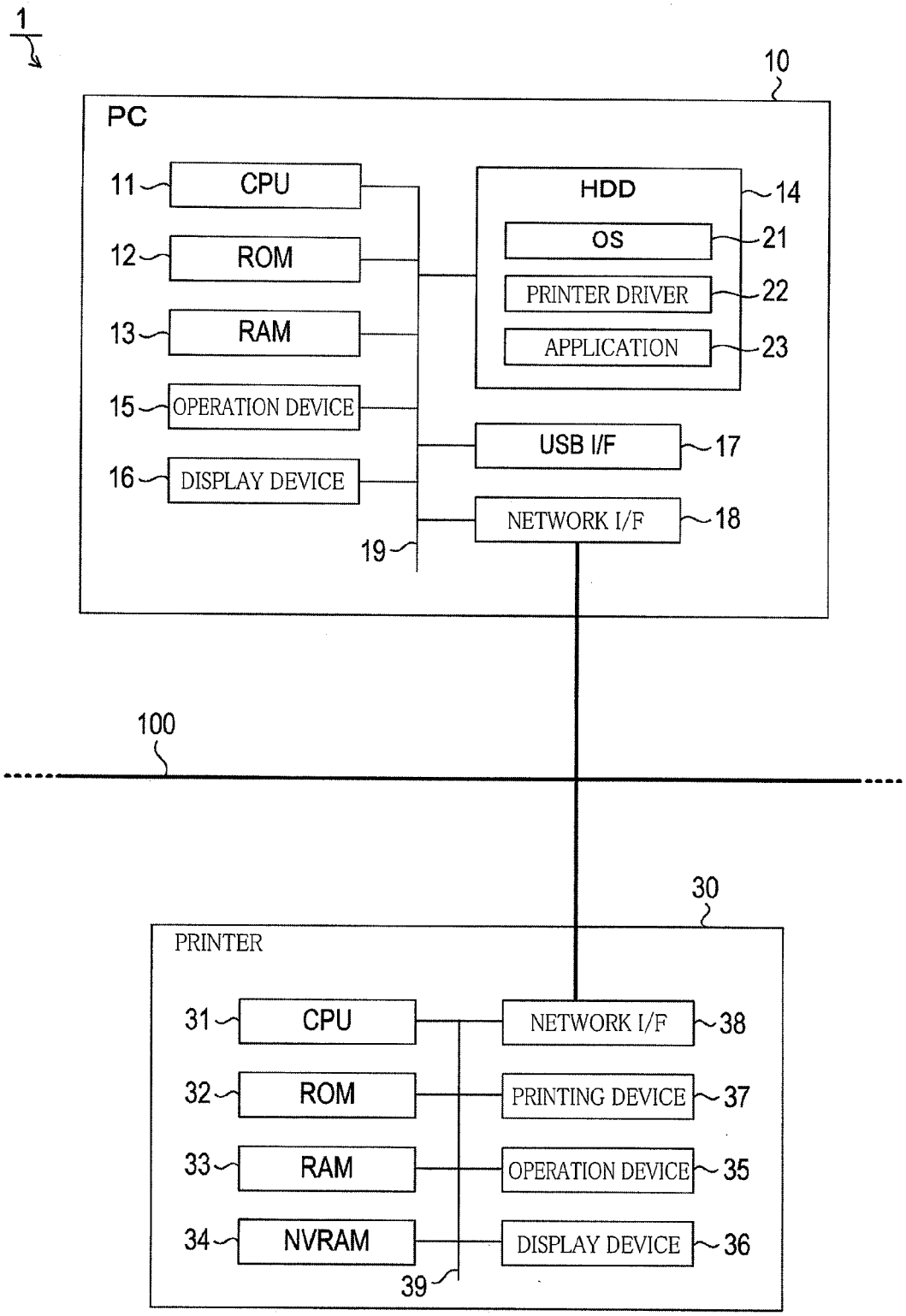
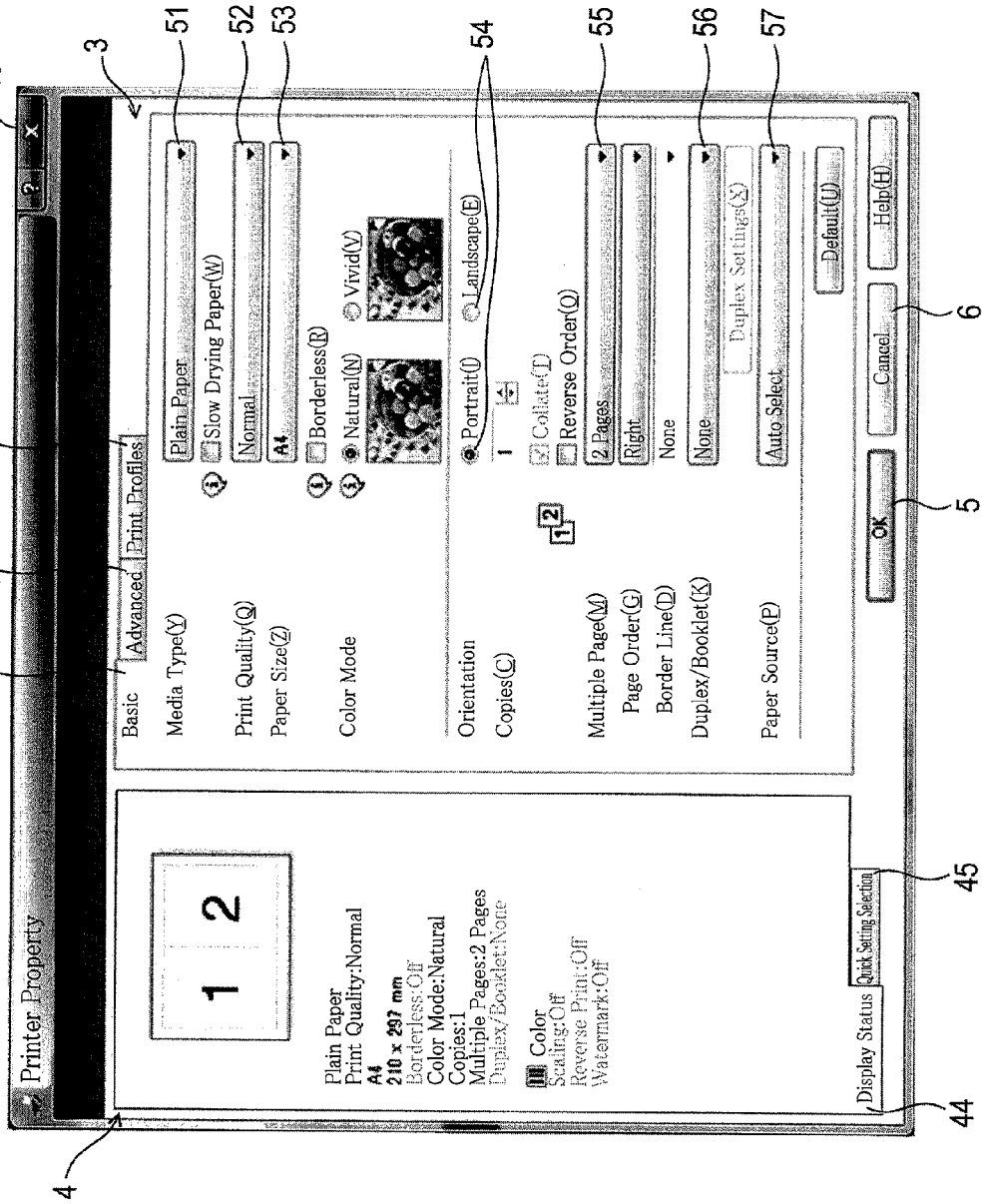

1
10
PC
11
CPU
12
ROM
13
RAM
15
OPERATION DEVICE
16
DISPLAY DEVICE
19
HDD
14
OS
21
PRINTER DRIVER
22
APPLICATION
23
USB I/F
17
NETWORK I/F
18
100
30
PRINTER
31
CPU
32
ROM
33
RAM
34
NVRAM
39
NETWORK I/F
38
PRINTING DEVICE
37
OPERATION DEVICE
35
DISPLAY DEVICE
36

FIG.2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Advanced
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Paper Size(Z)
Color Mode
Orientation
Copies(C)
Multiple Page(M)
Page Order(G)
Border Line(D)
Duplex/Booklet(K)
Paper Source(P)
Plain Paper
Slow Drying Paper(W)
Normal
A4
Borderless(R)
Natural(N)
Vivid(V)
Portrait(I)
Landscape(E)
Collate(T)
Reverse Order(O)
2 Pages
Right
None
None
Duplex Settings(S)
Auto Select
Default(U)
OK
Cancel
Help(H)
Display Status
Quick Setting Selection
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Print Quality:Normal
A4
210 x 297 mm
Borderless:Off
Color Mode:Natural
Copies:1
Multiple Pages:2 Pages
Duplex/Booklet:None
Color
Scaling:Off
Reverse Print:Off
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41
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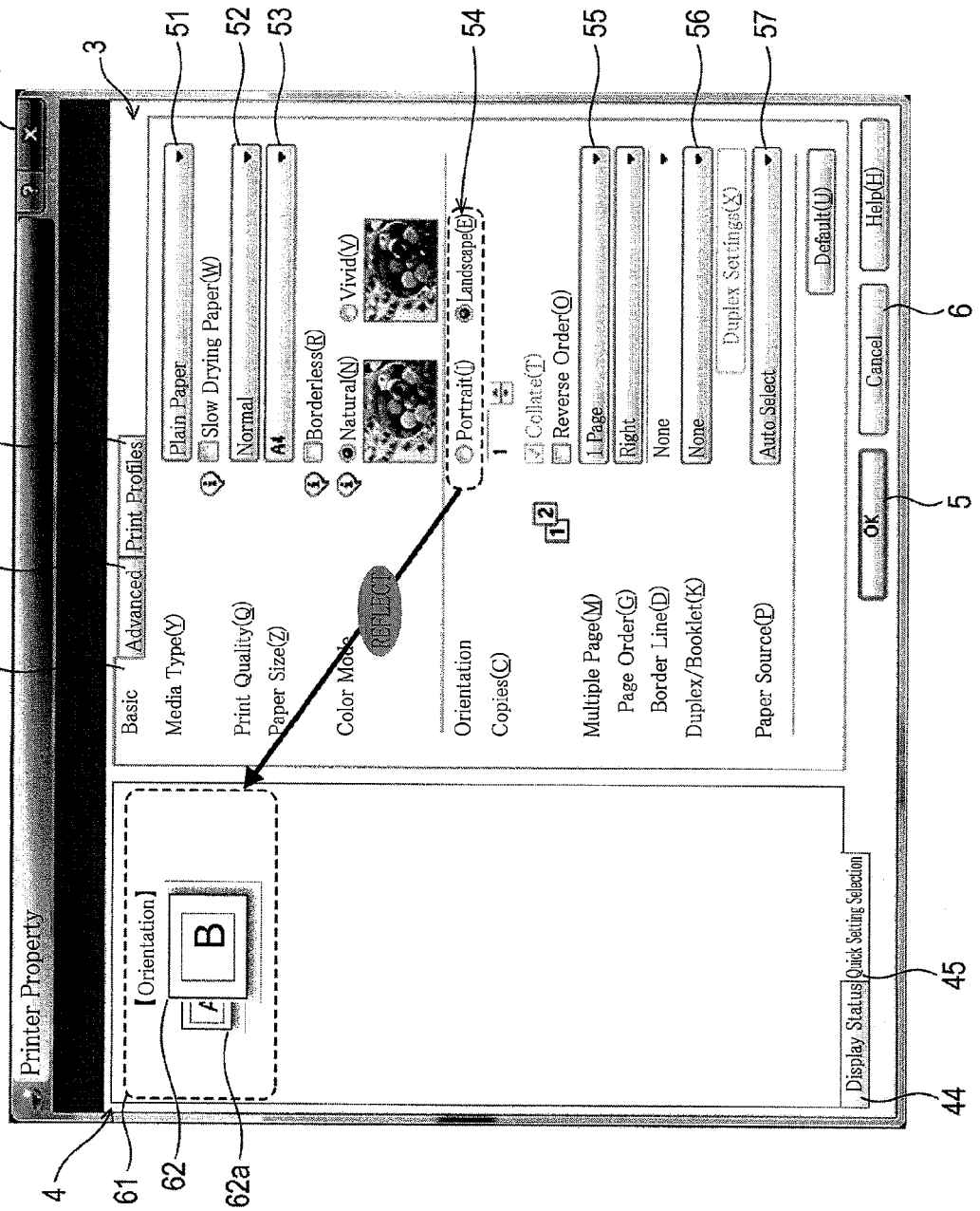
43
3
51
52
53
54
55
56
57
4
5
6
44
45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Page Order(G)
Border Line(D)
Duplex/Booklet(K)
Paper Source(P)
Plain Paper
Slow Drying Paper(W)
Normal
A4
Borderless(R)
Natural(N)
Vivid(V)
Portrait(I)
Landscape(E)
Collate(T)
Reverse Order(O)
1 Page
Right
None
None
Duplex Settings(X)
Auto Select
Default(U)
OK
Cancel
Help(H)
Display Status
Quick Setting Selection
[Orientation]
B
A
40
3
51
52
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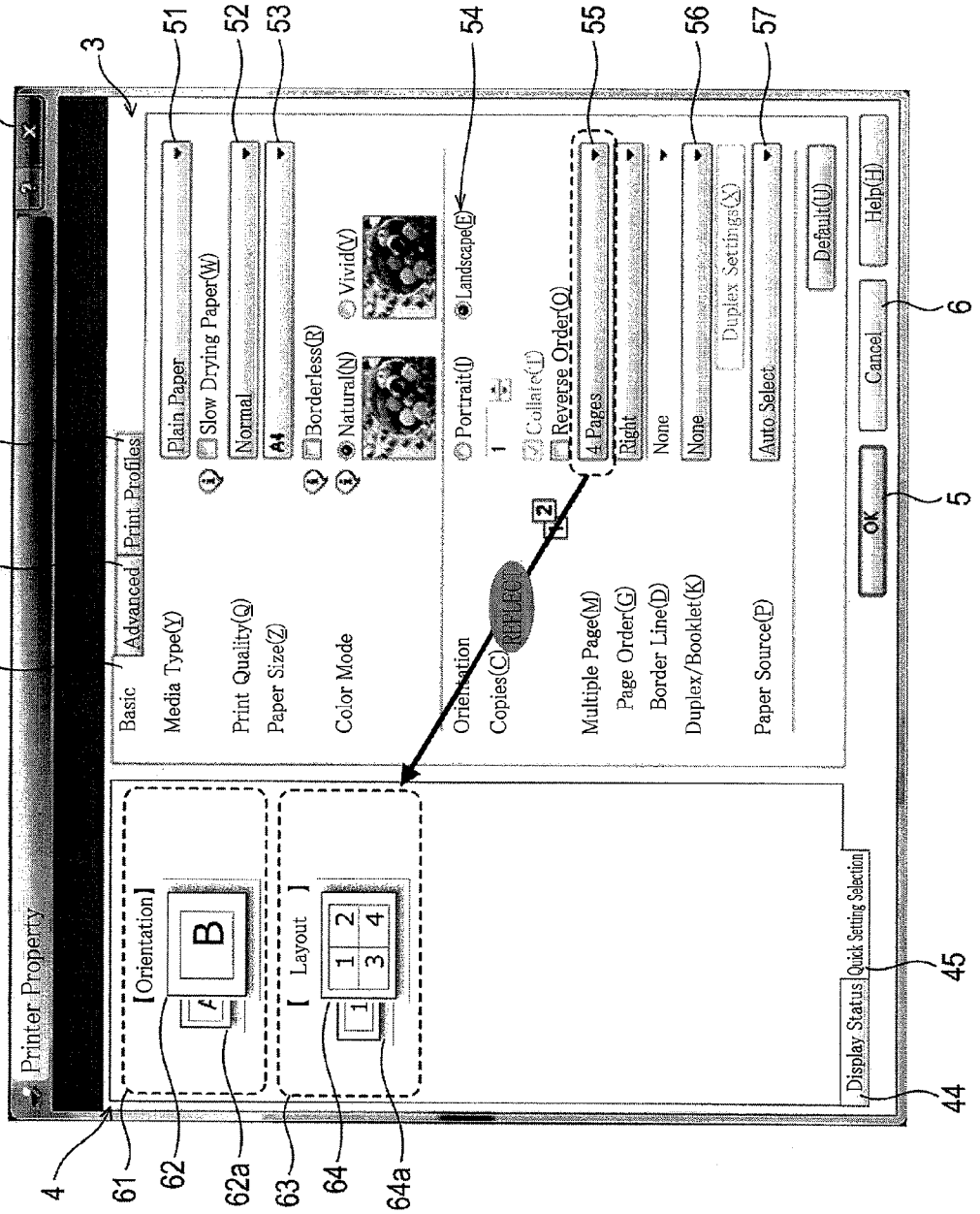
57
43
42
41
4
61
62
62a
5
6
45
44

FIG.3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Print Quality(Q)
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Paper Size(Z)
A4
Color Mode
Borderless(R)
Natural(N)
Vivid(V)
Orientation
Portrait(I)
Landscape(E)
Copies(C)
Collate(T)
Multiple Page(M)
Reverse Order(O)
4 Pages
Page Order(G)
Right
Border Line(D)
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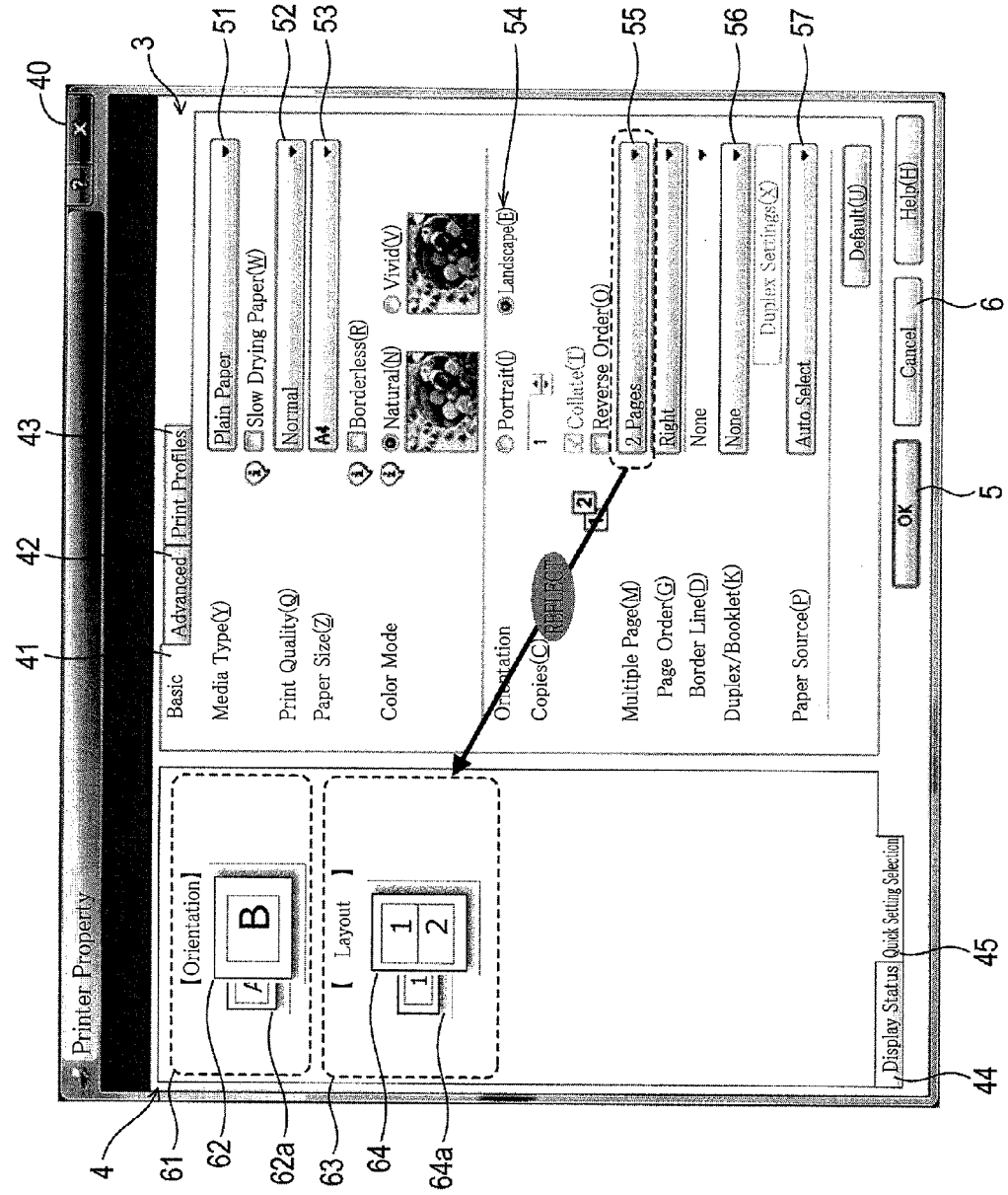
Duplex/Booklet(K)
None
Duplex Settings(X)
Paper Source(P)
Auto Select
Default(U)
Help(H)
OK
Cancel
[Orientation]
[Layout]
Display Status
Quick Setting Selection
40
3
51
52
53
54
55
56
57
43
42
41
4
61
62
62a
63
64
64a
44
45
5
6

FIG. 4


40
3
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52
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54
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56
57
43
42
41
Printer Property
Basic
Advanced
Print Profiles
Media Type(Y)
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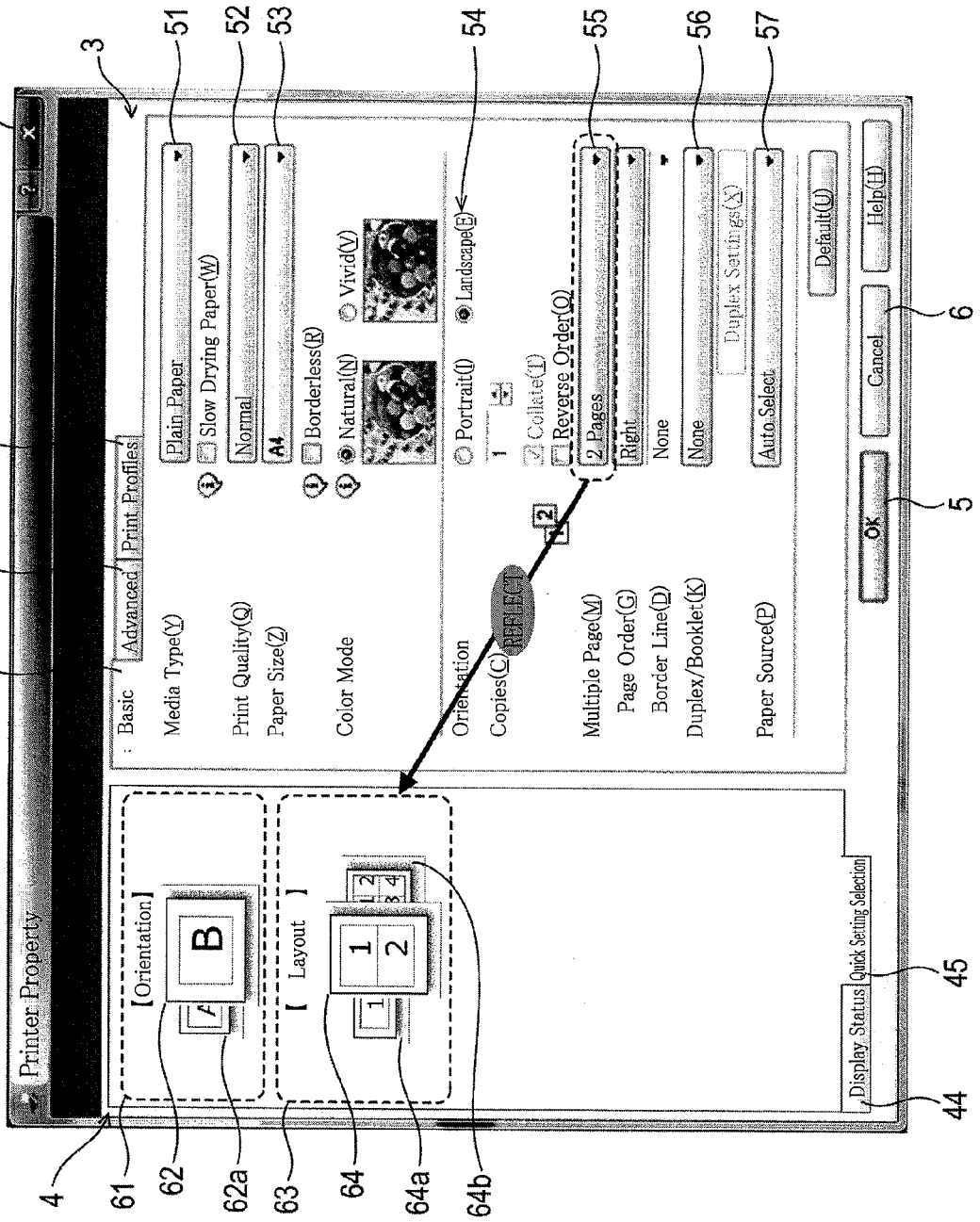
Paper Size(Z)
Color Mode
Orientation
Copies(C)
Multiple Page(M)
Page Order(G)
Border Line(D)
Duplex/Booklet(K)
Paper Source(P)
Plain Paper
Slow Drying Paper(W)
Normal
A4
Borderless(R)
Natural(N)
Vivid(V)
Portrait(I)
Landscape(L)
Collate(T)
Reverse Order(O)
2 Pages
Right
None
None
Duplex Settings(X)
Auto Select
Default(U)
Help(H)
OK
Cancel
6
5
[Orientation]
[Layout]
Display Status
Quick Setting Selection
45
44
4
61
62
62a
63
64
64a

FIG.5


Printer Property
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Advanced
Print Profiles
Media Type(Y)
Print Quality(Q)
Paper Size(Z)
Color Mode
Orientation
Copies(C)
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Page Order(G)
Border Line(D)
Duplex/Booklet(K)
Paper Source(P)
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Slow Drying Paper(W)
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A4
Borderless(R)
Natural(N)
Vivid(V)
Portrait(I)
Landscape(E)
Collate(T)
Reverse Order(O)
2 Pages
Right
None
None
Duplex Settings(X)
Auto Select
Default(U)
OK
Cancel
Help(H)
Display Status
Quick Setting Selection
[Orientation]
[Layout]
REFLECT
40
3
51
52
53
54
55
56
57
43
42
41
6
5
45
44
4
61
62
62a
63
64
64a
64b

FIG.6

FIG.7

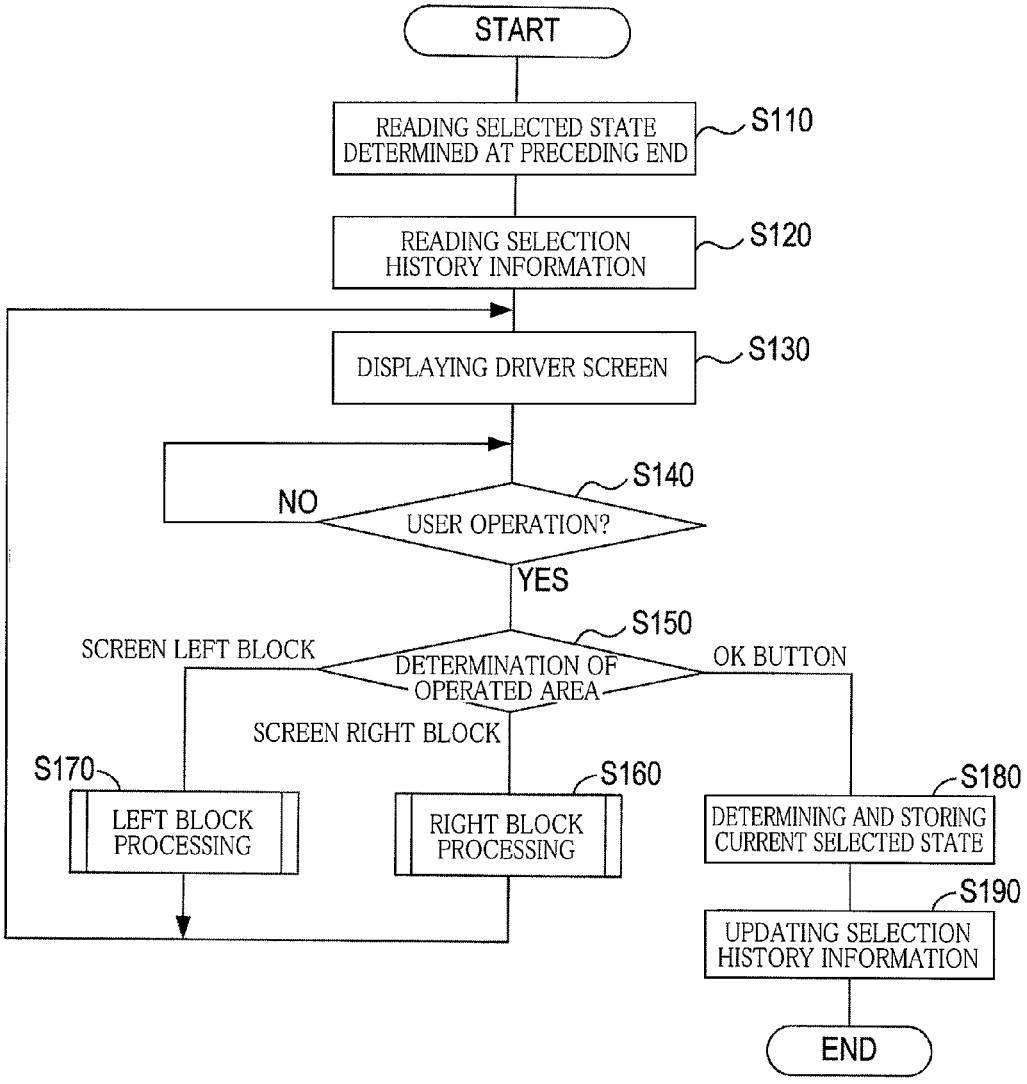

START
READING SELECTED STATE DETERMINED AT PRECEDING END
S110
READING SELECTION HISTORY INFORMATION
S120
DISPLAYING DRIVER SCREEN
S130
S140
NO
USER OPERATION?
YES
S150
SCREEN LEFT BLOCK
DETERMINATION OF OPERATED AREA
OK BUTTON
SCREEN RIGHT BLOCK
S170
LEFT BLOCK PROCESSING
S160
RIGHT BLOCK PROCESSING
S180
DETERMINING AND STORING CURRENT SELECTED STATE
S190
UPDATING SELECTION HISTORY INFORMATION
END

FIG.8

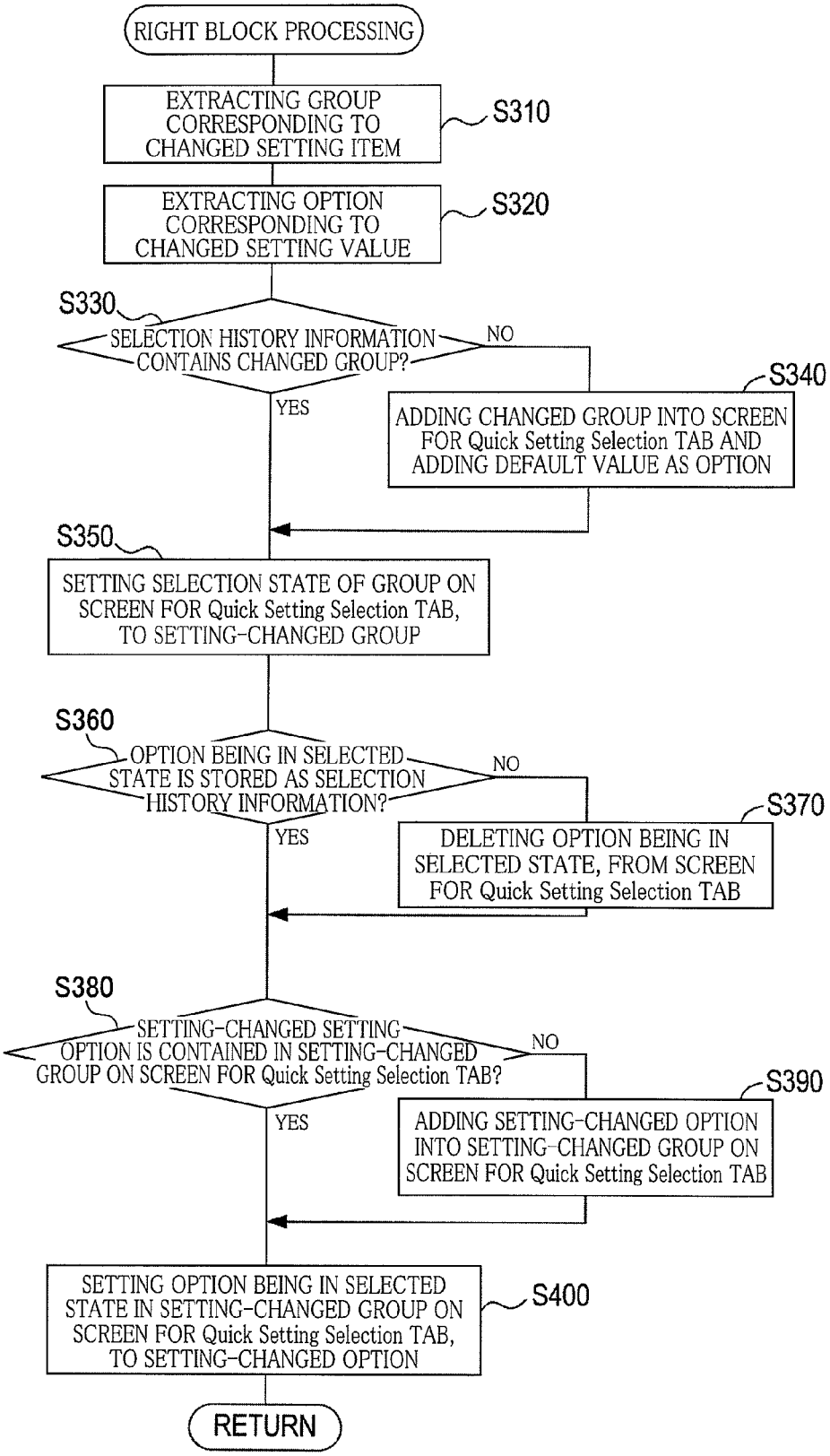
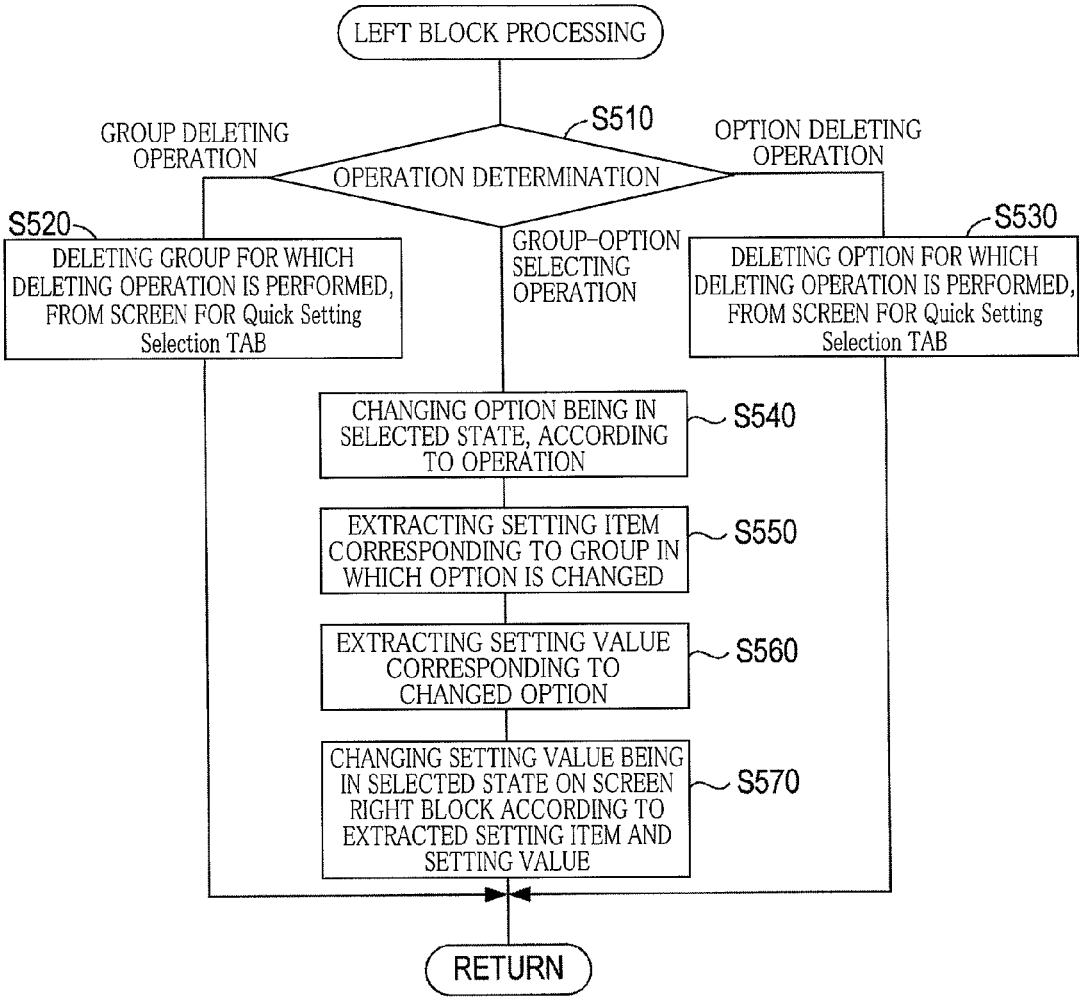

RIGHT BLOCK PROCESSING
EXTRACTING GROUP CORRESPONDING TO CHANGED SETTING ITEM
S310
EXTRACTING OPTION CORRESPONDING TO CHANGED SETTING VALUE
S320
S330
SELECTION HISTORY INFORMATION CONTAINS CHANGED GROUP?
NO
YES
S340
ADDING CHANGED GROUP INTO SCREEN FOR Quick Setting Selection TAB AND ADDING DEFAULT VALUE AS OPTION
S350
SETTING SELECTION STATE OF GROUP ON SCREEN FOR Quick Setting Selection TAB, TO SETTING-CHANGED GROUP
S360
OPTION BEING IN SELECTED STATE IS STORED AS SELECTION HISTORY INFORMATION?
NO
YES
S370
DELETING OPTION BEING IN SELECTED STATE, FROM SCREEN FOR Quick Setting Selection TAB
S380
SETTING-CHANGED SETTING OPTION IS CONTAINED IN SETTING-CHANGED GROUP ON SCREEN FOR Quick Setting Selection TAB?
NO
YES
S390
ADDING SETTING-CHANGED OPTION INTO SETTING-CHANGED GROUP ON SCREEN FOR Quick Setting Selection TAB
SETTING OPTION BEING IN SELECTED STATE IN SETTING-CHANGED GROUP ON SCREEN FOR Quick Setting Selection TAB, TO SETTING-CHANGED OPTION
S400
RETURN

FIG.9


LEFT BLOCK PROCESSING
S510
OPERATION DETERMINATION
GROUP DELETING OPERATION
OPTION DELETING OPERATION
GROUP-OPTION SELECTING OPERATION
S520
DELETING GROUP FOR WHICH DELETING OPERATION IS PERFORMED, FROM SCREEN FOR Quick Setting Selection TAB
S530
DELETING OPTION FOR WHICH DELETING OPERATION IS PERFORMED, FROM SCREEN FOR Quick Setting Selection TAB
CHANGING OPTION BEING IN SELECTED STATE, ACCORDING TO OPERATION
S540
EXTRACTING SETTING ITEM CORRESPONDING TO GROUP IN WHICH OPTION IS CHANGED
S550
EXTRACTING SETTING VALUE CORRESPONDING TO CHANGED OPTION
S560
CHANGING SETTING VALUE BEING IN SELECTED STATE ON SCREEN RIGHT BLOCK ACCORDING TO EXTRACTED SETTING ITEM AND SETTING VALUE
S570
RETURN

NON-TRANSITORY STORAGE MEDIUM STORING INSTRUCTIONS EXECUTABLE BY DEVICE CONTROL APPARATUS, DEVICE CONTROL METHOD, AND DEVICE CONTROL APPARATUS

CROSS REFERENCE TO RELATED APPLICATION

The present application claims priority from Japanese Patent Application No. 2014-069733, which was filed on Mar. 28, 2014, the disclosure of which is herein incorporated by reference in its entirety.

BACKGROUND

1. Technical Field

The present invention relates to a device control method, a device control apparatus, and a non-transitory storage medium storing a plurality of instructions executable by a computer of the device control apparatus.

2. Description of the Related Art

In the case where a device is connected to and controlled from an information processing device, a device driver is generally installed on the information processing device to control the device via the device driver. When using a printer as the device, for example, installation of the printer driver on the information processing device enables the information processing device to control the printer and allows a user to make settings for printing to perform printing using the settings.

The printer driver can set various kinds of setting items for printing. Various types of selectable setting values are provided for each of the setting items. The user can change a setting value to a desired value for each of the setting items depending on a purpose and a type of printing, for example.

However, there are a great number of setting items settable by the printer driver. The user has to find a desired one of the large number of setting items to change the setting value in each printing, resulting in usability.

To solve this problem, there is a technique in which the user registers frequently-used setting values as a favorite and selects the favorite before printing to perform printing using the registered setting.

SUMMARY

However, the above-described favorite registering function is often difficult for users (especially, users unfamiliar with operations of mechanical devices) to understand, making it difficult to register settings values as a favorite. Also, even if the user understands how to register, trouble and inconvenience of actual registration increase with increase in the number of setting items for registration.

Accordingly, an object of the disclosure is improving usability when setting a setting value required for controlling a device from a computer.

In one aspect of the disclosure, a non-transitory storage medium stores a plurality of instructions executable by a computer of a device control apparatus. The device control apparatus includes a display and a storage configured to store a setting value for controlling a device. The plurality of instructions, when executed by the computer, cause the device control apparatus to execute: a first screen displaying process in which the display displays a first setting screen thereon for selection of the setting value for each of a plurality of setting items; an option setting process in which when a setting value for at least one setting item of the plurality of setting items is changed from a particular setting value stored in the storage to a setting value as a changed setting value different from the particular setting value, the changed setting value is set as one of a plurality of options regarding setting values for at least one changed setting item which is the at least one setting item corresponding to the changed setting value; a second screen displaying process in which the display displays a second setting screen on which the one of the plurality of options which is set in the option setting process as the setting value for the at least one changed setting item is displayed in a selected state; and a storing process in which, for each of the at least one changed setting item, when the setting value determined by a selecting and determining operation for selecting and determining the setting value is different from the particular setting value, the determined setting value is stored as a selected and changed setting value into the storage.

In another aspect of the disclosure, a device control method, implementable by a computer of a device control apparatus, is for setting a setting value for controlling a device connected to the device control apparatus. The device control method includes: displaying a first setting screen on the display, the first setting screen including a first setting area for designating a first setting value for the particular setting item, the first setting value being different from the default setting value; receiving a first input for designating the first setting value for the particular setting item through the first setting screen; in response to receiving the first input, storing the first setting value in the storage in association with the particular setting item; displaying a second setting screen on the display, the second setting screen including a second setting area that shows the default setting value and the first setting value stored in the storage; receiving a second input for selecting one of the default setting value and the first setting value through the second setting screen; and determining the selected one of the default setting value and the first setting value for the particular setting item.

In still another aspect of the disclosure, a device control apparatus includes: a display; a storage storing a setting value for controlling a device and a plurality of instructions; and a processor. The plurality of instructions, when executed by the processor, cause the device control apparatus to execute steps including: displaying a first setting screen on the display, the first setting screen including a first setting area for designating a first setting value for the particular setting item, the first setting value being different from the default setting value; receiving a first input for designating the first setting value for the particular setting item through the first setting screen; in response to receiving the first input, storing the first setting value in the storage in association with the particular setting item; displaying a second setting screen on the display, the second setting screen including a second setting area that shows the default setting value and the first setting value stored in the storage; receiving a second input for selecting one of the default setting value and the first setting value through the second setting screen; and determining the selected one of the default setting value and the first setting value for the particular setting item.

In still another aspect of the disclosure, a non-transitory storage medium stores instructions executable by a computer of a device control apparatus. The device control apparatus includes a display and a storage storing a default setting value for a particular setting item. The instructions, when executed by the computer, cause the device control

apparatus to execute steps including: displaying a first setting screen on the display, the first setting screen including a first setting area for designating a first setting value for the particular setting item, the first setting value being different from the default setting value; receiving a first input for designating the first setting value for the particular setting item through the first setting screen; in response to receiving the first input, storing the first setting value in the storage in association with the particular setting item; displaying a second setting screen on the display, the second setting screen including a second setting area that shows the default setting value and the first setting value stored in the storage; receiving a second input for selecting one of the default setting value and the first setting value through the second setting screen; and determining the selected one of the default setting value and the first setting value for the particular setting item.

BRIEF DESCRIPTION OF THE DRAWINGS

The objects, features, advantages, and technical and industrial significance of the present disclosure will be better understood by reading the following detailed description of the embodiments, when considered in connection with the accompanying drawings, in which:

FIG. **1** is a block diagram illustrating a configuration of a printing system;

FIG. **2** is a view for explaining a first example of a driver screen;

FIG. **3** is a view for explaining a second example of a driver screen;

FIG. **4** is a view for explaining a third example of a driver screen;

FIG. **5** is a view for explaining a fourth example of a driver screen;

FIG. **6** is a view for explaining a fifth example of a driver screen;

FIG. **7** is a flow chart illustrating processings executed using a printer driver;

FIG. **8** is a flow chart illustrating a right block processing at **S160** in FIG. **7**; and

FIG. **9** is a flow chart illustrating a left block processing at **S170** in FIG. **7**.

DETAILED DESCRIPTION OF THE EMBODIMENTS

Hereinafter, there will be described embodiments by reference to the drawings.

(1) Configuration of Printing System

In one embodiment, as illustrated in FIG. **1**, a printing system **1** includes a personal computer (hereinafter referred to as "PC") **10** and a printer **30**. Data communication can be performed between the PC **10** and the printer **30** over a LAN (Local Area Network) **100**.

The PC **10** includes a CPU **11**, a ROM **12**, a RAM **13**, a hard disc drive (hereinafter referred to as "HDD") **14**, an operation device **15**, a display device **16**, a USB interface **17**, and a network interface **18** which are connected to each other by a bus **19**.

The HDD **14** is a storage device capable of storing various kinds of software, data, and the like. In the present embodiment, examples of software stored in the HDD **14** include an OS (Operating System) **21**, a printer driver **22**, and an application **23**. That is, the HDD **14** stores programs, data, and the like constituting such software. The ROM **12** is a well-known non-transitory memory which stores particular programs (e.g., a BIOS), data, and the like.

The CPU **11** executes various computations and control for devices of the PC **10** according to various programs, data, and the like stored in the ROM **12** and the HDD **14**. The RAM **13** is a transitory memory used as a main memory which is directly accessed by the CPU **11**. When executed by the CPU **11**, the program stored in the HDD **14** is temporarily read by the RAM **13** and then executed by the CPU **11** according to the program read by the RAM **13**.

The operation device **15** includes a keyboard and various kinds of pointing devices. Examples of the pointing devices include a mouse, a touchpad, and a pointing stick. The display device **16** includes a display such as a liquid crystal display or an organic EL display.

The operation device **15** includes a touch panel. Specifically, the touch panel is superposed on a display surface of the display device **16** on which image information is displayed. This configuration allows various kinds of input operations performed by various kinds of touch operations on the touch panel (e.g., tapping, a flick, a swipe, and a drag) in addition to various kinds of input operations performed, on a screen displayed on the display device **16**, using the keyboard and the various kinds of pointing devices.

The network interface **18** is a communication interface for connecting the PC **10** to a LAN **100**. The USB interface **17** is a communication interface for connecting the PC **10** to various kinds of peripheral devices by USB cables. Where the printer **30** includes a USB interface, the printer **30** and the PC **10** can be connected to each other by a USB cable.

The printer **30** includes a CPU **31**, a ROM **32**, a RAM **33**, an NVRAM (Non-Volatile RAM) **34**, an operation device **35**, a display device **36**, a printing device **37**, and a network interface **38** which are connected to each other by a bus **39**.

The CPU **31** executes various computations and control for devices of the printer **30** according to various programs stored in, e.g., the ROM **32** and the NVRAM **34**. The RAM **33** is used as a main memory which is directly accessed by the CPU **31**. The RAM **33** is also used as a buffer for storing print data received from the PC **10**. The NVRAM **34** is an electrically rewritable non-transitory memory. The NVRAM **34** stores various kinds of setting information about the printer **30**.

The operation device **35** is an input device capable of receiving an input operation performed by the user and includes operation buttons and a touch panel, for example. The display device **36** is constituted by a liquid crystal display, for example. A touch panel constituting the operation device **35** is superposed on a display region of the liquid crystal display.

The printing device **37** includes an ink jet or electronic photographic printing mechanism for printing an image on a recording medium such as a sheet. Upon receiving print data from the PC **10**, the printer **30** controls the printing device **37** to print an image based on the received print data. The network interface **38** is a communication interface for connecting the printer **30** to the LAN **100**.

(2) Explanation of Software included in PC **10**

The OS **21** having a multitasking function is installed on the PC **10** to execute a plurality of processes in parallel. These processes are cooperated to execute various kinds of processings. The printer driver **22** and the application **23** are also installed on the PC **10**.

In the following explanation, the CPU **11** which executes a program may be described simply by the name of program. For example, wordings "the printer driver **22** executes" may

mean wordings "the CPU **11** executing the printer driver **22** executes". This applies to the OS **21** and the application **23**, for example.

Examples of the application **23** include document software, spreadsheet software, and image processing software. In the following explanation, it is assumed that the application **23** is document software.

When the application **23** is activated on the PC **10**, and an instruction is provided by the user for printing a document created by the user, the application **23** produces a command for printing the document and transmits the command to the printer driver **22** via the OS **21**.

The printer driver **22** is well-known software (e.g., one kind of device driver) for controlling the printer **30** from the PC **10**.

When the user of the PC **10** performs a particular print command operation during execution of the application **23** to cause the printer **30** to print a document created using the application **23**, the application **23** displays a list of available printers (in the present embodiment, only the printer **30**). When the user selects the printer **30** to be used for printing and performs a particular setting-screen displaying operation, information about the operation is transmitted to the printer driver **22**, and the printer driver **22** causes the display device **16** to display a driver screen.

FIG. **2** illustrates one example of a driver screen **40**. The driver screen **40** is displayed, as an independent screen (also called a window), on a specific display area on the display device **16** of the PC **10**.

When roughly divided, the driver screen **40** includes a screen right block **3** and a screen left block **4** as display areas. An OK button **5** and a Cancel button **6** are displayed on a lower end portion of the driver screen **40**, specifically, below the screen right block **3**.

The screen right block **3** contains a Basic tab **41**, an Advanced tab **42**, a Print Profile tab **43**, one of which is selected. That is, on the screen right block **3**, all the contents are displayed for one of the three tabs **41-43** (noted that this displaying may be hereinafter referred to as "all-contents displaying"), and only a title of the tab is displayed for each of the other two tabs. By selecting a title of a particular tab, the user can display the tab on the most front side to display all the contents related to the tab. In FIG. **2**, all the contents related to the Basic tab **41** of the three tabs **41-43** are displayed on the screen right block **3** as one example.

Examples of specific method of selecting the tab include: a method of performing a left click on the mouse in a state in which a pointer of the mouse is located on a title of the tab; and a method of tapping an input object (e.g., a fingertip) directly on an area of the display device **16** on which the title is being displayed. This applies to an operation of selecting two tabs **44**, **45**, which will be described below, displayed on the screen left block **4**.

In a state in which the Basic tab **41** is selected, as illustrated in FIG. **2**, various kinds of setting items which can be set for printing of the printer **30** are displayed on the screen right block **3**, and a name of the setting item and a user interface element (hereinafter referred to as "selection UI") for selecting a setting value are also displayed on the screen right block **3** for each of the setting items. As illustrated in FIG. **2**, examples of the selection UI include selection boxes, radio buttons, and check boxes. A selecting/inputting operation can be performed on each of the selection UI by the user, and examples of the selecting/inputting operation include the mouse operation and the tapping operation.

In the state in which the Basic tab **41** is selected, the screen right block **3** contains various setting items including Media Type, Print Quality, Paper Size, Borderless (indicating borderless printing), Color Mode, Orientation (indicating a print orientation), Copies (indicating the number of copies), Reverse Order (indicating printing in reverse order), Multiple Pages (indicating a layout), Page Order, Border Line, Duplex/Booklet (indicating duplex printing and booklet printing), and Paper Source (indicating a sheet supply method). The selection UIs are displayed for the respective setting items.

For example, a Media Type selection box **51** is displayed for the setting item "Media Type", and the user can select one of a plurality of media types (e.g., Plain Paper, Thick Paper, and OHP Sheet) contained in the Media Type selection box **51**. The selected media type is switched to a selected state. In FIG. **2**, the setting value "Plain Paper" is in the selected state.

A Print Quality selection box **52** is displayed for the setting item "Print Quality", and a Paper Size selection box **53** is displayed for the setting item "Paper Size". In FIG. **2**, the setting value "Normal" is in the selected state for the setting item "Print Quality", and the setting value "A4" is in the selected state for the setting item "Paper Size".

For the setting item "Orientation", the names of selectable setting values indicating a portrait orientation (Portrait) and a landscape orientation (Landscape) is displayed, and radio buttons **54** are also displayed for the respective setting values. A desired print orientation can be switched to the selected state by selecting one of the radio buttons **54** (Portrait and Landscape). In FIG. **2**, the setting value "Portrait" is in the selected state for the setting item "Orientation".

The setting item "Multiple Pages" indicates how many pages are to be printed on each printing sheet in printing of the created document. A Multiple Page selection box **55** is displayed for the setting item "Multiple Pages". The user can select one of a plurality of types of layouts (e.g., 2 Pages, 4 Pages, and 8 Pages) contained in the Multiple Page selection box **55**. The selected layout is switched to the selected state. In FIG. **2**, the setting value "2 Pages" is in the selected state for the setting item "Multiple Pages".

A Duplex selection box **56** is displayed for the setting item "Duplex", and a Paper Source selection box is displayed for the setting item "Paper Source". In FIG. **2**, the setting value "None" is in the selected state for the setting item "Duplex" (that is, duplex printing is not performed), and the setting value "Auto Select" is in the selected state for the setting item "Paper Source".

In initial displaying of the driver screen **40** after the printer driver **22** is installed on the PC **10**, a preset initial value (hereinafter referred to as "default value") is displayed in the selected state as each of the setting values for the respective setting items. In the present embodiment, as one example, the default value for the setting item "Orientation" is set at "Portrait", and the default value for the setting item "Multiple Pages" is set at "1 Page". Likewise, for each of the Advanced tab **42** and the Print Profile tab **43**, the setting items and the selection UIs are displayed, allowing the user to select the setting values.

When the Cancel button **6** is pressed, the driver screen **40** disappears from the display device **16**. In this case, the CPU **11** invalidates input operations which are performed on the driver screen **40** during a period extending from a point in time when the driver screen **40** is displayed on the display device **16** to a point in time when the Cancel button **6** is pressed.

When the OK button **5** is pressed, the driver screen **40** disappears from the display device **16** as in the case where the Cancel button **6** is pressed. In this case, however, each of the setting values being in the selected state at the pressing of the OK button **5** is determined as a corresponding one of the setting values for the respective setting items.

Thus, after the pressing of the OK button **5**, when execution of printing is actually instructed, and the print data is transmitted to the printer **30**, not only the print data but also information about the setting value determined upon the pressing of the OK button **5** is transmitted to the printer **30**. The printer **30** performs printing for the print data based on the transmitted setting values. It is noted that the OK button **5** and the Cancel button **6** are pressed by the mouse operation and the tapping operation, for example.

The screen left block **4** contains the Display Status tab **44** and the Quick Setting Selection tab **45**, one of which is selected. That is, on the screen left block **4**, all the contents are displayed for one of the two tabs **44**, **45**, and only a title is displayed for the other tab. The user can selects the title of one of the tabs to display all the contents related to the selected tab. In FIG. **2**, all the contents related to the Display Status tab **44** are displayed on the screen left block **4**. In the state in which the Display Status tab **44** is selected, a setting value currently being in the selected state is displayed for each of particular one of the settings items related to a selected one of the tabs **41-43** contained in the screen right block **3**.

(3) Characteristic Function of Printer Driver **22**

In the present embodiment, one of the most characteristic functions of the printer driver **22** is a function of changing a setting value for a particular setting item in a state in which the Quick Setting Selection tab **45** is selected on the screen left block **4** of the driver screen **40**. This function will be explained in detail.

A specific example will be explained with reference to FIG. **3**. In FIG. **3**, the Quick Setting Selection tab **45** is selected on the screen left block **4**. In initial displaying of the driver screen **40** after the printer driver **22** is installed on the PC **10**, no contents are displayed for the Quick Setting Selection tab **45**, that is, a blank state is established for the Quick Setting Selection tab **45**. On the screen right block **3**, in this state, all the setting values related to each of the tabs **41-43** are set at the respective default values.

When this initial state is established in which the Basic tab **41** is selected and when the setting value for the setting item "Orientation" is changed from "Portrait" as the default value to "Landscape", as illustrated in FIG. **3**, an Orientation group **61** which is a group corresponding to the setting item "Orientation" is newly added into the screen for the Quick Setting Selection tab **45**. Each of the changed setting value (i.e., the setting value after the change) and the default value is added as an option into the Orientation group **61** (specifically, icons indicating the respective values are added). Also, in the state in which the Basic tab **41** is selected, the changed option (the option after the change), i.e., the setting value being in the selected state on the screen right block **3** (the setting value "Landscape" in this case) is displayed also in the Orientation group **61** as the selected state. Specifically, the icon indicating "Landscape" is displayed as a selected-state icon **62** at a center in the group, and the icon indicating the other option (the setting value "Portrait" as the default value in this case) is displayed, on a right or left side of the selected-state icon **62**, as a non-selected-state icon **62***a* having a smaller size than the selected-state icon **62**. It is noted that image data indicative of the icon indicating each setting value is contained as a part of the printer driver **22**.

In the Orientation group **61**, the option being in the selected state can be switched by a particular operation. Specifically, when the icon indicating "Portrait" displayed as the non-selected-state icon **62***a* is selected by, e.g., the mouse operation or the tapping operation, the selected-state icon **62** to be displayed at the center is switched to the icon indicating "Portrait". Conversely, the icon indicating "Landscape" previously displayed as the selected-state icon **62** is displayed as the non-selected-state icon **62***a* in a smaller size. Furthermore, when the option being in the selected state is changed from "Landscape" to "Portrait" in the Orientation group **61** as described above, this change is reflected in the screen right block **3**. That is, the setting value being in the selected state for the setting item "Orientation" is automatically changed from "Landscape" to "Portrait" on the screen for the Basic tab **41**. That is, in the present embodiment, the selected state in the screen for the Quick Setting Selection tab **45** and the selected state in the screen for each of the tabs **41-43** are always in synchronization with each other, so that the same setting value is in the selected state in the screen right block **3** and the screen left block **4**.

For some setting items, four or more options are contained in one group in the screen left block **4** in the state in which the Quick Setting Selection tab **45** is selected. In the present embodiment, the number of icons displayable at the same time for one group is three, at most, including the icon being in the selected state at the center (see FIG. **6**). Thus, in the case where four or more options are contained in one group, icons indicating some options are hidden without being displayed on the most front side. In this case, the user who wants to select the hidden option can operate the non-selected-state icon on a right or left side or perform a swipe operation on a display area in the group in the right and left direction, for example, to slide the displayed icons in the right and left direction, which can display the hidden icon in the selected state.

When the OK button **5** is pressed in the state illustrated in FIG. **3**, i.e., in a state in which the setting value for the setting item "Orientation" is changed to "Landscape", and the setting value "Landscape" is in the selected state, the selected state in this situation is determined and stored into the HDD **14**. Also, when the OK button **5** is pressed, the option being in the selected state in each group on the screen for the Quick Setting Selection tab **45** is stored as selection history information into the HDD **14**. This selection history information is cumulatively stored each time when the OK button **5** is pressed.

When the driver screen **40** is thereafter displayed again, the CPU **11** controls the display device **16** based on the information stored in the HDD **14** to display the setting values determined by the previous pressing of the OK button **5**, such that the setting values are in the selected state. The screen for the Quick Setting Selection tab **45** is displayed in the same manner. After the driver screen **40** disappears in response to the pressing of the OK button **5** in the state illustrated in FIG. **3**, when the driver screen **40** is displayed again, the driver screen **40** contains the screen identical to the screen illustrated in FIG. **3**. Specifically, for the Quick Setting Selection tab **45**, the selection history information is read, and icons indicating the respective setting values and an icon indicating the default value are displayed for each of the groups stored as the selection history information. For each group, an icon indicating the setting value being in the selected state at the previous determination is displayed as the selected-state icon at the center in the group.

In the case where a plurality of groups have been added in the screen for the Quick Setting Selection tab **45**, the

groups are displayed so as to be arranged in the up and down direction (see FIG. **4**). In the present embodiment, the number of groups displayable on the screen for the Quick Setting Selection tab **45** at the same time is four at the maximum. Thus, in the case where five or more groups have been added in the screen for the Quick Setting Selection tab **45**, some groups are hidden without being displayed. In this situation, in the case where the user wants to change the option being in the selected state for the hidden group, for example, the user can click an up and down arrow, not shown, displayed on the screen for the Quick Setting Selection tab **45** or perform a swipe operation in the up and down direction on the screen for the Quick Setting Selection tab **45** to slide the displayed groups in the up and down direction, which can display the hidden group.

When the setting value for the setting item "Multiple Pages" is changed to "4 Pages" on the screen for the Basic tab **41** in the state illustrated in FIG. **3**, for example, as illustrated in FIG. **4**, a Multiple Page group **63** which is a group corresponding to the setting item "Multiple Pages" is newly added into the screen left block **4** in the state in which the Quick Setting Selection tab **45** is selected. Each of the changed setting value and the default value is added as an option into the Multiple Page group **63** (specifically, icons indicating the respective values are added). Also, on the screen for the Basic tab **41**, the changed option, i.e., the setting value being in the selected state (the setting value "4 Pages" in this case) is displayed also in the Multiple Page group **63** as the selected state. Specifically, the icon indicating "4 Pages" is displayed as a selected-state icon **64** at a center in the group, and the icon indicating the other option (the setting value "1 Page" as the default value in this case) is displayed, on a right or left side of the selected-state icon **64**, as a non-selected-state icon **64***a* having a smaller size than the selected-state icon **64**.

The option being in the selected state can be switched in the Multiple Page group **63** as in the Orientation group **61**. Also, as in the Orientation group **61**, when the selected state is switched in the Multiple Page group **63**, the change is reflected in the screen right block **3**. For example, when an icon indicating "1 Page" is selected in the Multiple Page group **63**, and the icon indicating "1 Page" is thereby changed to the selected-state icon **64**, the screen for the Basic tab **41** is switched in synchronization with this change, that is, the setting value being in the selected state for the setting item "Multiple Pages" is also changed from "4 Pages" to "1 Page". When the OK button **5** is pressed in the state illustrated in FIG. **4**, the selected state at the pressing is determined and stored into the HDD **14**, and the option being in the selected state in each group on the screen for the Quick Setting Selection tab **45** is cumulatively stored as the selection history information into the HDD **14**. When the driver screen **40** is thereafter displayed again, the display device **16** displays the driver screen **40** containing the same selected-state icon as displayed on the driver screen **40** illustrated in FIG. **4**. Likewise, as for the Quick Setting Selection tab **45**, the screen at the previous determination is displayed.

In the state illustrated in FIG. **4**, for example, when the setting value for the setting item "Multiple Pages" is changed from "4 Pages" to "2 Pages" on the screen for the Basic tab **41**, as illustrated in FIG. **5**, the setting value "2 Pages" is newly added, as an option, into the Multiple Page group **63** displayed on the screen for the Quick Setting Selection tab **45**. Also, the option "2 Pages" is set to the selected state. That is, the selected-state icon **64** is switched to the icon indicating the option "2 Pages". Conversely, the icon indicating the option "4 Pages" previously displayed as the selected-state icon **64** is dismissed from the Multiple Page group **63**. In this example, the option "4 Pages" being in the selected state is not an option previously determined and stored as the selection history information but a temporary option newly selected during current displaying and having not been determined yet. In the present embodiment, even in the case where the temporary option is selected and set as the option being in the selected state on the screen for the Quick Setting Selection tab **45**, when another setting value is thereafter selected on the screen for the Basic tab **41**, the temporary option is dismissed from the screen for the Quick Setting Selection tab **45**.

However, the transition of the screen for the Quick Setting Selection tab **45** from the screen illustrated in FIG. **4** to the screen illustrated in FIG. **5** is one example, and the present invention is not limited to this transition. For example, each time when a new setting value not having been added into the screen for the Quick Setting Selection tab **45** is selected on the screen for the Basic tab **41**, the new setting value may be cumulatively added as an option into the screen for the Quick Setting Selection tab **45**.

Specifically, in the case where the setting value for the setting item "Multiple Pages" from "4 Pages" to "2 Pages" on the screen for the Basic tab **41** from the state illustrated in FIG. **4**, as illustrated in FIG. **6**, an option "2 Pages" may be newly added and set in the selected state without removing the option "4 Pages" previously set in the selected state, from the Multiple Page group **63**. In this case, when the setting value for the setting item "Multiple Pages" is changed to "8 Pages" on the screen for the Basic tab **41** from the state illustrated in FIG. **6**, for example, an option "8 Pages" is added into the Multiple Page group **63** on the screen for the Quick Setting Selection tab **45**, resulting in a state in which four options have been added in total. However, since the number of icons displayable at the same time for one group is three, at the maximum, including the icon being in the selected state at the center as described above, an icon indicating the newly added option "8 Pages" is displayed as the selected-state icon **64** at the center, and an icon indicating "1 Page" as the default value is displayed, but one of icons respectively indicating "2 Pages" and "4 Pages" is in a non-displayed state. Alternatively, instead of this configuration, the PC **10** may be configured such that the icon indicating "8 Pages" is displayed at the center, and two icons which are later in being added as options are set in the displayed state among the three icons respectively indicating "1 Page", "2 Pages", and "4 Pages".

As thus described, the PC **10** may be configured such that each time when a new setting value not having been added into the screen for the Quick Setting Selection tab **45** is selected on the screen for the screen right block **3**, the setting value is cumulatively added into the screen for the screen for the Quick Setting Selection tab **45**. Also in this case, however, an option being in the selected state on the screen for the Quick Setting Selection tab **45** at the pressing of the OK button **5** is stored as the selection history information. That is, even in the case where the screen is changed from the screen illustrated in FIG. **3** to the screen illustrated in FIG. **4** in response to a change of the setting value for the setting item "Multiple Pages" to "4 Pages" on the screen for the Basic tab **41**, and thereafter the screen is further changed to the screen illustrated in FIG. **6** in response to a change of the setting value for the setting item "Multiple Pages" to "2 Pages" on the screen for the Basic tab **41**, for example, when the OK button **5** is finally pressed on the screen illustrated in FIG. **6**, for example, the setting value "2 Pages" being in

the selected state at the time is stored as the selection history information, and the setting value "4 Pages" not being in the selected state is not stored as the selection history information for the Multiple Page group **63**.

(4) Processing of Printer Driver **22**

There will be next explained, with reference to FIG. **7**, processings executed by the CPU **11** of the PC **10** which controls the printer driver **22**. The CPU **11** of the PC **10** executes the processings by reading programs of the printer driver **22** at a specific timing. The flow in FIG. **7** begins when the particular setting-screen displaying operation is performed while the printer driver **22** is being executed.

This flow in FIG. **7** begins with S**110** at which the CPU **11** reads, from the HDD **14**, the selected states determined at the last end, i.e., at the point in time when display of the driver screen **40** is finished in response to the last pressing of the OK button **5**. As a result, the CPU **11** recognizes the setting values each of which is in the selected state at the last pressing of the OK button **5**.

The CPU **11** at S**120** reads the selection history information from the HDD **14**. As a result, the CPU **11** recognizes contents to be displayed on the screen for the Quick Setting Selection tab **45**. That is, the CPU **11** recognizes groups for the respective setting items for each of which at least setting value different from the default value has been determined, and the CPU **11** also recognizes, for each of the groups, the at least one setting value having been determined, as an option.

The CPU **11** at S**130** controls the display device **16** to display the driver screen **40** thereon. Specifically, on the screen right block **3**, all-contents displaying is performed for the Basic tab **41**, and the selected state of the setting value for each of the setting item is set for the setting value recognized at S**110** (i.e., the setting value determined at the last time). On the screen left block **4**, the screen for the Quick Setting Selection tab **45** is displayed, and the groups and the options recognized at S**120** are displayed on the screen for the Quick Setting Selection tab **45**. For each of the groups, at this displaying, one of corresponding options which is in the selected state at the last determination is set to the selected state, and an icon indicating the option is displayed as the selected-state icon at the center.

The CPU **11** at S**140** determines whether the user has operated the driver screen **40** or not. When an operation is performed by the user (S**140**: YES), the CPU **11** at S**150** determines an area of the driver screen **40** on which the operation of the user is performed.

When the screen right block **3** is operated by the user, this flow goes to S**160**. When the screen left block **4** is operated by the user, this flow goes to S**170**. When the OK button **5** is pressed by the user, this flow goes to S**180**. Though not shown in FIG. **7**, when the Cancel button **6** is pressed, the CPU **11** dismisses the driver screen **40**, and this flow ends.

The CPU **11** at S**180** determines the current selected state for each of the setting items and stores the current selected state into the HDD **14**. The CPU **11** at S**190** updates the selection history information based on the current display state of the screen for the Quick Setting Selection tab **45**. That is, in the case where the options displayed as the selected state for the respective groups include an option not contained in the selection history information, the option is newly added as the selection history information.

FIG. **8** illustrates a flow of the right block processing at S**160**. This flow begins with S**310** at which the CPU **11** extracts, from the selection history information, a group corresponding to the setting item changed in the screen right block **3**. The CPU **11** at S**320** extracts, from the selection history information, an option corresponding to a setting value for the setting item changed in the screen right block **3**.

The CPU **11** at S**330** determines whether the selection history information contains the group corresponding to the changed setting item or not, that is, the CPU **11** determines whether the group has been extracted at S**310** or not. When the selection history information contains the group corresponding to the changed setting item, this flow goes to S**350**. When the selection history information does not contain the group corresponding to the changed setting item, the CPU **11** at S**340** newly adds the group corresponding to the changed setting item into the screen for the Quick Setting Selection tab **45** and adds the default value as the option into the group (specifically, the CPU **11** displays the icon indicating the default value as the non-selected-state icon).

The CPU **11** at S**350** sets a selection state of the group on the screen for the Quick Setting Selection tab **45**, to the group for which the setting has been changed (hereinafter may be referred to as "setting-changed group").

The CPU **11** at S**360** determines whether an option being currently in the selected state in the setting-changed group on the screen for the Quick Setting Selection tab **45** is an option stored as the selection history information or not. When the option being currently in the selected state in the setting-changed group on the screen for the Quick Setting Selection tab **45** is the option stored as the selection history information, this flow goes to S**380**. When the option being currently in the selected state in the setting-changed group on the screen for the Quick Setting Selection tab **45** is not the option stored as the selection history information, this flow goes to S**370**. The CPU **11** at S**370** deletes the option being currently in the selected state in the setting-changed group, from the screen for the Quick Setting Selection tab **45**.

The CPU **11** at S**380** determines whether a setting value for which the setting has been changed (hereinafter may be referred to as "setting-changed setting value") is contained in the setting-changed group on the screen for the Quick Setting Selection tab **45** or not. When the setting-changed setting value is contained in the setting-changed group on the screen for the Quick Setting Selection tab **45**, this flow goes to S**400**. When the setting-changed setting value is not contained in the setting-changed group on the screen for the Quick Setting Selection tab **45**, this flow goes to S**390**. The CPU **11** at S**390** adds the setting-changed option into the setting-changed group on the screen for the Quick Setting Selection tab **45**.

The CPU **11** S**400** sets an option being in the selected state in the setting-changed group on the screen for the Quick Setting Selection tab **45**, to the setting-changed option. This flow then goes to S**130** at which the CPU **11** controls the display device **16** to display the driver screen **40**. Specifically, on the screen right block **3**, the selected state of the setting value for each of the setting items is changed according to the user operation detected at S**140**. On the screen left block **4**, the group added at S**340** is displayed on the screen for the Quick Setting Selection tab **45**, and one of a plurality of options of the setting-changed group which is set at S**400** is deleted or added into the setting-changed group. In addition, one of the selected options is displayed in the selected state. As a result, the setting value whose setting has been changed on the screen right block **3** is displayed, as the option being in the selected state, on the screen for the Quick Setting Selection tab **45**.

FIG. **9** illustrates a flow of the left block processing at S**170**. This flow begins with S**510** at which the CPU **11** executes an operation determination. In the operation deter-

mination, the CPU **11** determines a type of the operation performed on the screen left block **4**. More specifically, the CPU **11** determines which operation has been performed among a group deleting operation for deleting a particular group, an option deleting operation for deleting a particular option, and a group-option selecting operation for changing an option in a particular group.

When the CPU **11** at S**510** determines that the operation performed on the screen left block **4** is the group deleting operation, this flow goes to S**520**. The CPU **11** at S**520** deletes a group for which the deleting operation is performed, from the screen for the Quick Setting Selection tab **45**.

When the CPU **11** at S**510** determines that the operation performed on the screen left block **4** is the option deleting operation, this flow goes to S**530**. The CPU **11** at S**530** deletes an option for which the deleting operation is performed, from the screen for the Quick Setting Selection tab **45**.

When the CPU **11** at S**510** determines that the operation performed on the screen left block **4** is the group-option selecting operation, this flow goes to S**540**. The CPU **11** at S**540** changes the option being in the selected state in the group to be operated, according to the operation performed by the user. The CPU **11** at S**550** extracts a setting item corresponding to the group in which the option is changed at S**540**, from the setting items on the screen right block **3**. The CPU **11** at S**560** extracts a setting value corresponding to the option changed to the selected state at S**540**, from the settings values for the setting item extracted at S**550**. The CPU **11** at S**570** changes the setting value being in the selected state for the setting item extracted at S**550**, to the setting value extracted at S**560** on the screen right block **3**. This flow thereafter goes to S**130** at which the CPU **11** controls the display device **16** to display the driver screen **40** thereon. Specifically, on the screen for the Quick Setting Selection tab **45**, one of the options or the group deleted at S**520** or S**530** from the screen left block **4** is deleted, and the selection state of the setting value is changed according to the setting item and the setting value extracted at S**570**.

(5) Effects of Embodiment

In the printer driver **22** in the present embodiment described above, the setting values each having been changed from the default value on the screen right block **3** are displayed as options also on the screen left block **4** in the state in which the Quick Setting Selection tab **45** is selected. On the screen for the Quick Setting Selection tab **45**, the user can switch the option being in the selected state.

The options displayed on the screen for the Quick Setting Selection tab **45** are the setting values which are affected by the setting change history and cumulatively stored as the selection history information. Thus, the user can use the Quick Setting Selection tab **45** to easily and efficiently set the setting values as needed, improving usability.

When the option being in the selected state is switched on the screen for the Quick Setting Selection tab **45**, the selected state of the setting value for the setting item is changed on the screen right block **3**. That is, the selected state is always the same on both of the screens. This configuration allows the user to reliably recognize the current selected state.

When the setting value not contained in the Quick Setting Selection tab **45** is newly selected on the screen right block **3**, the setting value is newly added as an option into the screen for the Quick Setting Selection tab **45** and displayed in the selected state. The newly added option may be kept as the option until the OK button **5** is thereafter pressed. In this case, the setting values changed before pressing of the OK button **5** are cumulatively added into the screen for the Quick Setting Selection tab **45**, making it possible to change the selected state of each of the setting values using the Quick Setting Selection tab **45**.

When a group is newly added into the screen for the Quick Setting Selection tab **45**, and an option is added, a default value is also added as the option. With this configuration, in the case where the user wants to change a changed setting value back to the default value, the user can easily change the setting value back to the default value using the Quick Setting Selection tab **45**.

The contents added to the screen for the Quick Setting Selection tab **45** can be deleted as needed. Specifically, the user can delete all the options at a time for each group and can delete the options individually. In the case where the setting values are frequently changed and determined, the number of options increases on the screen for the Quick Setting Selection tab **45**, so that options not frequently used by the user may be kept displayed on the screen for the Quick Setting Selection tab **45**. In the present embodiment, however, the user can delete the option, making it possible to keep displaying the appropriate number of options on the screen for the Quick Setting Selection tab **45**.

In the present embodiment, the PC **10** is one example of a device control apparatus. The printer **30** is one example of a device. The CPU **11** of the PC **10** is one example of a computer and a controller. The printer driver **22** is one example of a device control program. The screen for the Basic tab **41** is one example of a first setting screen, and the screen for the Quick Setting Selection tab **45** is one example of a second setting screen. The default value is one example of a particular setting value. The HDD **14** is one example of a storage. Each of the icons indicating a corresponding one of the options displayed on the screen for the Quick Setting Selection tab **45** is one example of a selection image. The processing at S**130** is one example of a first screen displaying process. The processing at S**390** is one example of an option setting process. The processings at S**400** and S**130** are one example of a second screen displaying process. The processing at S**190** is one example of a storing process. The processing at S**400** is one example of a synchronization process. The processing at S**140** is one example of a receiving process. The processing at S**180** is one example of a determining process. The processings at S**520** and **530** are one example of a selection canceling process. The processing at S**510** is one example of a canceling-operation receiving process. The processings at S**400** and S**130** are one example of a selection canceling process.

Other Embodiments

(1) Some or all of setting values not determined but temporality determined by the user may be stored as the selection history information in addition to the setting values previously determined. With this configuration, when displaying the driver screen **40**, the CPU **11** can display not only the setting values previously determined but also the setting values temporarily selected, on the screen for the Quick Setting Selection tab **45** each as an option.

(2) In the above-described embodiment, in the case where a new group is added into the screen for the Quick Setting Selection tab **45** in response to first change of the setting value for a certain setting item from the default value to another setting value, the default value is also added into the group. However, it is not essential to add the default value into the group. Only the setting value changed and different from the default value may be added, as an option, into each of the groups on the screen for the Quick Setting Selection

tab **45**. In this case, however, in the case where the setting value changed from the default value is temporarily added to the screen for the Quick Setting Selection tab **45**, but the user thereafter operates the screen right block **3** to change the setting value to the default value again, the default value may be added as an option into the group on the screen for the Quick Setting Selection tab **45**.

(3) While three icons are displayable at the maximum at the same time for one group on the screen left block **4** in the above-described embodiment, but the present invention is not limited to this configuration. The number of icons displayable for one group at the same time may be determined as needed. Also, it is possible to determine how to determine the selection history on the screen for the Quick Setting Selection tab **45**. Also, the arrangement, shape, and size of each tab on the driver screen **40** may be determined as needed.

(4) The selected state may be determined at a time different from pressing of the OK button **5**. For example, the selected state may be determined when printing is actually instructed and performed by the printer **30** after pressing of the OK button **5**.

(5) Application of the present invention is not limited to the PC **10**, the printer **30**, or the printer driver **22**. The present invention may be applied to any configuration for controlling a device from an information processing device capable of executing a program.

(6) It is to be understood that the disclosure is not limited to the details of the illustrated embodiment, but may be embodied with various changes and modifications, which may occur to those skilled in the art, without departing from the spirit and scope of the disclosure. For example, a function of one constituent element in the above-described embodiment may be divided for a plurality of constituent elements, and functions of a plurality of constituent elements may be combined to form one constituent element. At least a portion of the configuration in the above-described embodiment may be replaced with a well-known configuration having a similar function. The configuration in the above-described embodiment may be partly omitted as long as the purpose of the present invention is attained. At least a portion of the configuration in the above-described embodiment may be added to or replaced with a configuration in said another embodiment, for example.

What is claimed is:

1. A non-transitory storage medium storing a plurality of instructions executable by a computer of a device control apparatus, the device control apparatus comprising a display and a storage configured to store a setting value for controlling a device,

the plurality of instructions, when executed by the computer, causing the device control apparatus to execute:

an option setting process in which when a setting value for a particular setting item of a plurality of setting items is changed from a particular setting value stored in the storage to a setting value as a changed setting value different from the particular setting value, the changed setting value is set as one of a plurality of options regarding setting values for the particular;

a first screen displaying process in which the display displays a first setting screen thereon for designating the setting value for each of the plurality of setting items, and in which, in response to change of the setting value to the changed setting value, the display displays the changed setting value, in a designated state, in the first setting screen;

a second screen displaying process in which, in response to the change of the setting value to the changed setting value, the display displays both of a particular setting image and a changed setting image in a second setting screen, the particular setting image corresponding to the particular setting value, the changed setting image corresponding to the changed setting image, the changed setting image and the changed setting value being simultaneously displayed in a designated state in the first setting screen and in the second setting screen respectively, the particular setting image being displayed in a non-designated state in the second setting screen; and

a storing process in which, for the particular setting item, when the setting value is determined by a determining operation the determined setting value as the changed setting value is stored into the storage.

2. The non-transitory storage medium according to claim **1**, wherein when the setting value, for the particular setting item, is changed from a first setting value as the changed setting value to a second setting value different from each of the particular setting value and the first setting value and when executed by the computer, the plurality of instructions cause the device control apparatus to:

set the particular setting value, the first setting value, and the second setting value as the plurality of options in the option setting process; and

control the display to display (i) the second setting value in the designated state and (ii) the particular setting value and the first setting value in the non-designated state in the second screen displaying process.

3. The non-transitory storage medium according to claim **1**, wherein when executed by the computer, the plurality of instructions cause the device control apparatus to execute:

a determining process in which when the determining operation is performed, a setting value displayed in the designated state on the second setting screen is determined as a control setting value, for the particular setting item, and a setting value displayed in the designated state on the first setting screen is determined as the control setting value, for each of at least one of the plurality of setting items which differs from the particular setting item; and

the storing process in which, for the particular setting item corresponding to the changed setting value stored in the storage, when the particular setting value is changed to the changed setting value on the first setting screen, and the changed setting value is determined by the determining operation, the determined setting value is stored as the changed setting value into the storage.

4. The non-transitory storage medium according to claim **3**, wherein when executed by the computer, the plurality of instructions cause the device control apparatus to display the setting value determined in a preceding determining process, in the designated state based on the changed setting value stored in the storage, at start of the first screen displaying process and the second screen displaying process.

5. The non-transitory storage medium according to claim **1**, wherein when executed by the computer, the plurality of instructions cause the device control apparatus to execute a designation canceling process in which the device control apparatus cancels one of (i) a set state of a setting value being set as one of the plurality of options and (ii) set states of all setting values being set as the plurality of options.

6. The non-transitory storage medium according to claim 5, wherein when executed by the computer, the plurality of instructions cause the device control apparatus to execute a canceling-operation receiving process in which a designation canceling operation for canceling the designation canceling process is received.

7. The non-transitory storage medium according to claim 1,

wherein the plurality of options are associated with a plurality of setting images respectively indicating the plurality of options,

wherein the second setting screen contains a particular number of setting images comprising a first setting image associated with the one of the plurality of options which is in the designated state, and

wherein when executed by the computer, the plurality of instructions cause the device control apparatus to execute a designation switch process in which an image switching operation for switching the designated state from the one of the plurality of options to another of the plurality of options is received on the second setting screen, and the display displays, in the designated state, a second setting image associated with said another of the plurality of options.

8. A device control method, implementable by a computer of a device control apparatus, for setting a setting value for controlling a device connected to the device control apparatus,

the device control method comprising:

displaying a first setting screen on the display, the first setting screen for designating a first setting value for the particular setting item, the first setting value being different from a default setting value;

receiving a first input for designating the first setting value for the particular setting item through the first setting screen;

in response to receiving the first input, displaying the first setting value in a designated state in the first setting screen;

in response to receiving the first input, storing the first setting value in the storage in association with the particular setting item;

in response to receiving the first input, displaying both of a default setting image and a first setting image in a second setting screen on the display, the default setting image corresponding to the default setting value, the first setting image corresponding to the first setting value, the first setting image and the first setting value being simultaneously displayed in a designated state in the second setting screen and in the first setting screen, respectively, the default setting image being displayed in a non-designated state in the second setting screen;

receiving a second input for designating one of the default setting image and the first setting image through the second setting screen; and

determining the designated one of the default setting value and the first setting value for the particular setting item based on the received designation.

9. A device control apparatus comprising: a display; a storage storing a setting value for controlling a device and a plurality of instructions; and a processor,

the plurality of instructions, when executed by the processor, causing the device control apparatus to execute steps comprising:

displaying a first setting screen on the display, the first setting screen for designating a first setting value for the particular setting item, the first setting value being different from the default setting value;

receiving a first input for designating the first setting value for the particular setting item through the first setting screen;

in response to receiving the first input, displaying the first setting value in a designated state in the first setting screen;

in response to receiving the first input, storing the first setting value in the storage in association with the particular setting item;

in response to receiving the first input, displaying both of a default setting image and a first setting image in a second setting screen on the display, the default setting image corresponding to the default setting value, the first setting image corresponding to the first setting value, the first setting image and the first setting value being simultaneously displayed in a designated state in the second setting screen and in the first setting screen, respectively, the default setting image being displayed in a non-designated state in the second setting screen;

receiving a second input for designating one of the default setting image and the first setting image through the second setting screen; and

determining the designated one of the default setting value and the first setting value for the particular setting item based on the received designation.

10. A non-transitory storage medium storing instructions executable by a computer of a device control apparatus, the device control apparatus comprising a display and a storage storing a default setting value for a particular setting item,

the instructions, when executed by the computer, causing the device control apparatus to execute steps comprising:

displaying a first setting screen on the display, the first setting screen for designating a first setting value for the particular setting item, the first setting value being different from the default setting value;

receiving a first input for designating the first setting value for the particular setting item through the first setting screen;

in response to receiving the first input, displaying the first setting value in a designated state in the first setting screen;

in response to receiving the first input, storing the first setting value in the storage in association with the particular setting item;

in response to receiving the first input, displaying both of a default setting image and a first setting image in a second setting screen on the display, the default setting image corresponding to the default setting value, the first setting image corresponding to the first setting value, the first setting image and the first setting value being simultaneously displayed in a designated state in the second setting screen and in the first setting screen, respectively, the default setting image being displayed in a non-designated state in the second setting screen;

receiving a second input for designating one of the default setting image and the first setting image through the second setting screen; and

determining the designated one of the default setting value and the first setting value for the particular setting item based on the received designation.

11. The non-transitory storage medium according to claim 10, wherein the first setting image is displayed in the second setting screen in a highlighted manner.

12. The non-transitory storage medium according to claim 10, wherein the first setting value is displayed on the display in a first setting area of the first setting screen while the first setting image is displayed on the display in the second setting screen in a highlighted manner.

13. The non-transitory storage medium according to claim 10, wherein the instructions, when executed by the computer, causing the device control apparatus to further execute steps comprising:

receiving a third input for removing the first setting value from the second setting screen; and

in response to receiving the third input, deleting the first setting image from the storage.

14. The non-transitory storage medium according to claim 10, wherein the instructions, when executed by the computer, causing the device control apparatus to further execute steps comprising:

displaying the first setting screen on the display for designating a second setting value for the particular setting item, the second setting value being different from the default setting value and the first setting value;

receiving a fourth input for designating the second setting value for the particular setting item through the first setting screen; and

in response to receiving the fourth input, displaying the second setting screen on the display, the second setting screen including a second setting area that shows the default setting value, the first setting value and a second setting image corresponding to the second setting value, the second setting image being displayed in a highlighted manner.

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